Cobalt Digital Inc.

9003

Dual 3G/HD/SD SDI
Reclocking Distribution Amplifier

Owner's Manual

9003-OM
Version: 1.6

9003 • Dual 3G/HD/SD Reclocking Distribution Amplifier Owner's Manual

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Important Regulatory and Safety Notices

Before using this product and any associated equipment, refer to the "Important Safety Instructions" listed below so as to avoid personnel injury and to prevent product damage.

Products may require specific equipment, and /or installation procedures be carried out to satisfy certain regulatory compliance requirements. Notices have been included in this publication to call attention to these specific requirements.

Symbol Meanings

This symbol on the equipment refers you to important operating and maintenance (servicing) instructions within the Product Manual Documentation. Failure to heed this information may present a major risk of damage or injury to persons or equipment.

Warning

The symbol with the word **"Warning"** within the equipment manual indicates a potentially hazardous situation, which if not avoided, could result in death or serious injury.

Caution

The symbol with the word "**Caution**" within the equipment manual indicates a potentially hazardous situation, which if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices.

Notice

The symbol with the word "**Notice**" within the equipment manual indicates a situation, which if not avoided, may result in major or minor equipment damage or a situation which could place the equipment in a non-compliant operating state.

ESD Susceptibility

This symbol is used to alert the user that an electrical or electronic device or assembly is susceptible to damage from an ESD event.

Important Safety Instructions

Caution

This product is intended to be a component product of the openGear® frame. Refer to the openGear frame Owner's Manual for important safety instructions regarding the proper installation and safe operation of the frame as well as it's component products.

Warning

Certain parts of this equipment namely the power supply area still present a safety hazard, with the power switch in the OFF position. To avoid electrical shock, disconnect all A/C power cords from the chassis' rear appliance connectors before servicing this area.

Warning

Service barriers within this product are intended to protect the operator and service personnel from hazardous voltages. For continued safety, replace all barriers after any servicing.

This product contains safety critical parts, which if incorrectly replaced may present a risk of fire or electrical shock. Components contained within the product's power supplies and power supply area, are not intended to be customer serviced and should be returned to the factory for repair.

To reduce the risk of fire, replacement fuses must be the same type and rating.

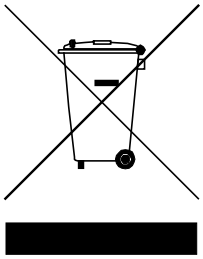
Only use attachments/accessories specified by the manufacturer.

Environmental Information

The equipment that you purchased required the extraction and use of natural resources for its production. It may contain hazardous substances that could impact health and the environment.

To avoid the potential release of those substances into the environment and to diminish the need for the extraction of natural resources, Cobalt Digital encourages you to use the appropriate take-back systems. These systems will reuse or recycle most of the materials from your end-of-life equipment in an environmentally friendly and health conscious manner.

The crossed-out wheeled bin symbol invites you to use these systems.



If you need more information on the collection, reuse, and recycling systems, please contact your local or regional waste administration.

You can also contact Cobalt Digital for more information on the environmental performances of our products.

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Introduction

In This Chapter

This chapter includes the following sections:

- A Word of Thanks
- Overview
- Functional Block Diagram
- Supported Audio and Video Formats
- Documentation Terms

A Word of Thanks

Congratulations on choosing the 9003 Dual 3G/HD/SD Reclocking Distribution Amplifier. The 9003 is part of a full line of modular conversion gear for broadcast TV environments. The Cobalt Digital line includes video decoders and encoders, audio embeders and de-embeders, distribution amplifiers, format converters, and much more. Cobalt openGear® modular conversion gear will meet your signal conversion and distribution needs now and well into the future.

Should you have questions pertaining to the installation or operation of your 9003, please contact us at the numbers listed on the back cover of this manual. We are happy to help with any questions regarding this or any other of our cards.

Overview

The 9003 is a high quality two channel, Dual 3G/HD/SD Reclocking Distribution Amplifier. It is capable of equalizing and reclocking two channels in HD or SD.

The card has two 3G/HD/SD-SDI inputs, labeled “SDI Input 1” and “SDI Input 2”. The card has two sets of four SDI outputs labeled “SDI output A” and “SDI output B”. The outputs of the four BNCs in each set always emit the same data.

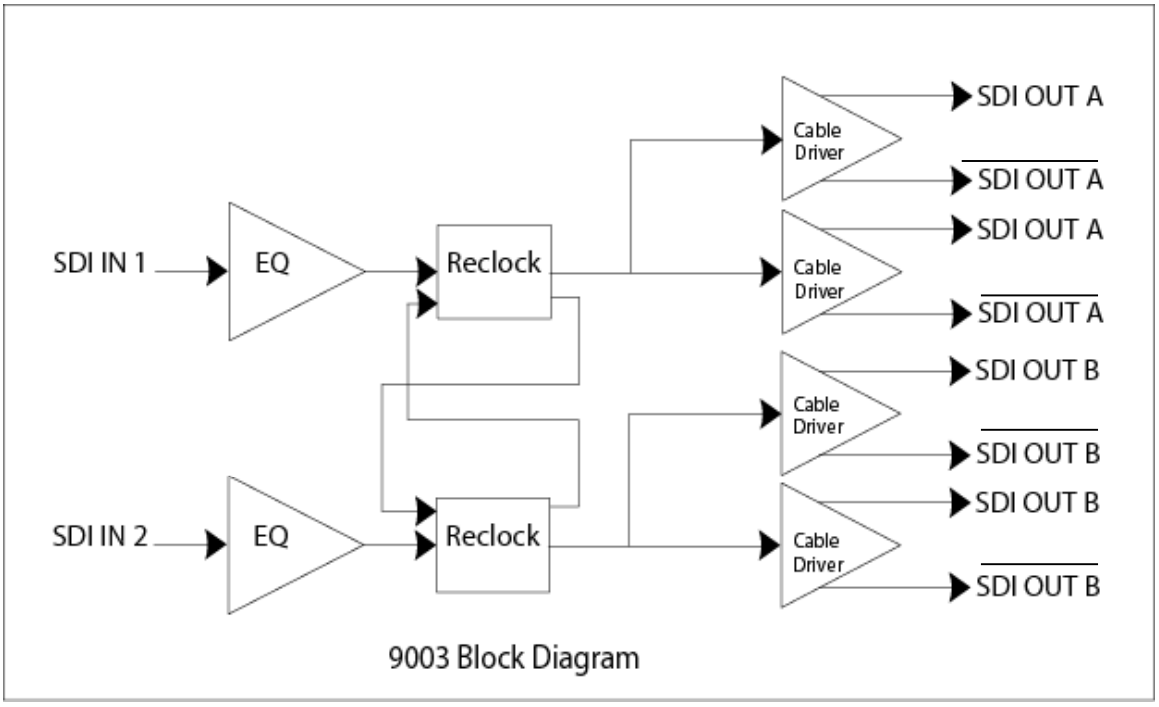
There are four routing modes available on the card.

1) Input 1 → Output A, Input 2 → Output B
2) Input 1 → Output A, Input 1 → Output B
3) Input 2 → Output A, Input 2 → Output B

4) Failover mode: Input 1 → Output A&B, until Input 1 loses lock, then Input 2 -> Outputs A&B if input 1 is restored the card uses it again.

The 9003 can equalize and reclock incoming SDI signal using up to 300m of cable at 270 Mbps, up to 120m of cable at 1.585 Gbps, and up to 100m of cable at 3 Gbps (1694A cable).

Functional Block Diagram



9003 Block Diagram

Supported Serial Rates

The 9003 will reclock 270 Mbps, 1.585 Gbps, 1.5835 Gbps, and 3 Gbps signals. Signals of other rates will be equalized and distributed to the outputs, and the reclocker will be bypassed.

Documentation Terms

The following terms are used throughout this guide:

- "**Frame**" refers to the HPF-9000 or 8321 frame that houses the **9003** card.
- "**Operator**" and "**User**" both refer to the person who uses the **9003**.
- "**Board**" and "**Card**" all refer to the **9003** card itself, including all components and switches.
- "**System**" and "**Video system**" refers to the mix of interconnected production and terminal equipment in which the **9003** operates.

Installation and Setup

In This Chapter

This chapter includes the following sections:

- Static Discharge
- Unpacking
- Rear Module Installation (Optional)
- Board Installation
- BNC Connections
- Menu Structure
- Factory Defaults

Static Discharge

Whenever handling the card and other related equipment, please observe all static discharge precautions as described in the following note:

ESD Susceptibility

Static discharge can cause serious damage to sensitive semiconductor devices. Avoid handling circuit boards in high static environments such as carpeted areas, and when wearing synthetic fiber clothing. Always exercise proper grounding precautions when working on circuit boards and related equipment.

Unpacking

Unpack each card you received from the shipping container, and check the contents against the packing list to ensure that all items are included. If any items are missing or damaged, contact your sales representative or Cobalt Digital directly.

Rear Module Installation (Optional)

If you are installing the card into a slot with no rear module, you should have ordered and received a Rear Module with your card. You will need to install it in the frame before you can connect cables.

Use the following steps to install the rear module in a frame:

1. On the rear of the frame, locate the card frame slot.
2. As shown in Figure 2, seat the bottom of the rear module in the seating slot at the base of the frame's back plane.

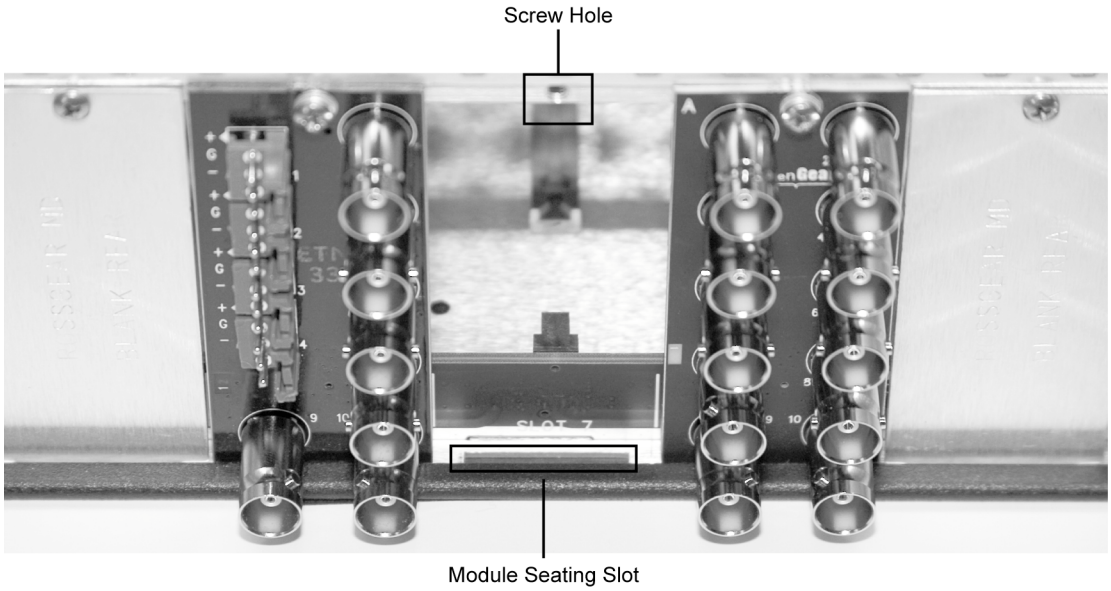


Figure 2. Rear Module Installation

3. Align the top hole of the rear module with the screw hole on the top edge of the frame back plane.
4. Using a Phillips driver and the supplied screw, fasten the rear module panel to the frame back plane. Do not over tighten.

This completes the procedure for installing the rear module in the frame.

Board Installation

Use the following steps to install the card in the frame:

1. Refer to the frame product manual to ensure that the frame is properly installed according to instructions.

Warning

Heat and power distribution requirements within a frame may dictate specific slot placement of cards. Cards with many heat-producing components should be arranged to avoid areas of excess heat build-up, particularly in frames using convection cooling.

Note: This card is default set with **remote control set to disabled**. If DashBoard or a Cobalt Remote Panel is to be used with card, enable remote control on card as described in Card Control and Status on the next page **before** installing card.

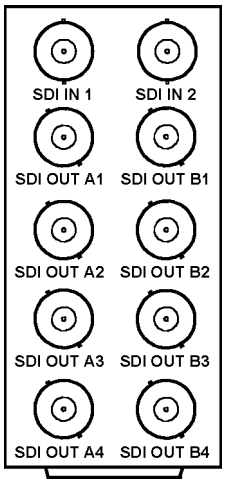
2. After selecting the desired frame installation slot, hold the card by the edges and carefully align the card edges with the slots in the frame. Then, fully insert the card into the frame until the rear connection plugs are properly seated on the midplane and rear modules.

This completes the procedure for installing the card in the frame.

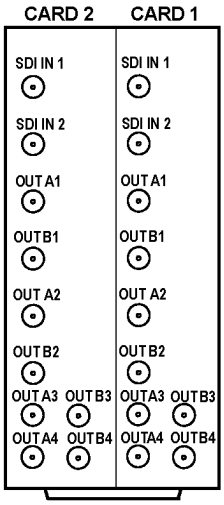
Cable Connections

This section provides instructions for connecting cables to the 9003 rear modules. Connect the input and output cables according to the following diagram. Split rear module RM20-9003-B/S allow two cards to be installed in adjacent slots. B/S versions are available in DIN1.0/2/3 and HDBNC versions.

RM20-9003-A

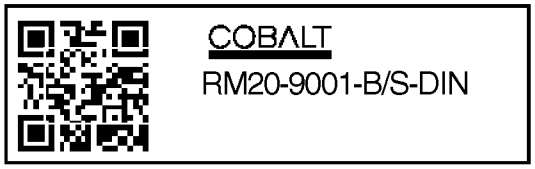


RM20-9003-B/S



Note: Outputs **OUT A1**, **OUT A3** and **OUT B2** and **OUT B4** are inverting. These outputs are **not** compatible with ASI video.

Figure 3. Connector Designations for the Card Rear Modules



SAMPLE-NOT FOR USE

Due to the density of connector placement on Rear Modules using high-density connectors (e.g., RM20-9001-B/S-DIN), these modules use a QR barcode label instead a regular label. Simply scan the image with a smart phone and a link to the rear module label (as shown in our catalog) will appear. (Smart phone must have a QR reader app such as QuickMark QR Code Reader or equivalent.)

Not all devices may be able to acquire the image. If this occurs, use the device to access the web page for card/rear module to view the diagram.

Card Control and Status

Card Status

The card has an LED that indicates whether Dashboard remote control is enabled, or if the switch bank controls the card. See description of switch 1 below.

The first bank of four LED's indicates the routing mode. There will be one LED illuminated for output A and one illuminated for output B, indicating from which input each output is being routed.
The card also indicates the status of each of the outputs signal with the two banks of four LEDs labeled with the different supported formats (1080, 720, 625, 525). When the card has locked to a particular output format, that LED will be illuminated. When the card has not locked to a particular video format, the card will search all possible formats, and the lights will cycle rapidly.

Switches

There is a bank of eight switches (S1) on the front edge that controls the card.

Segment		Function
1		**Up – Remote control Enabled* Down – Remote Control Disabled**
2	**3**	**Selects Routing**
ON	ON	In 1 → Out A, In 2 → Out B
ON	OFF	In 1 → Out A, In 1 → Out B
OFF	ON	In 2 → Out A, In 2 → Out B
OFF	OFF	Failover (Selects In 1 when present, otherwise In 2)
4	**5**	**Selects Rate for Out A**
ON	ON	Automatic rate determination
ON	OFF	Reserved
OFF	ON	3G/HD
OFF	OFF	SD
6	**7**	**Selects Rate for Out B**
ON	ON	Automatic rate determination
ON	OFF	Reserved
OFF	ON	3G/HD
OFF	OFF	SD
8		**Switch 8 is reserved**

* Switch 1 controls the behavior of the rest of the switches. With switch 1 set in the up position, Dashboard remote control software can change the settings of the card. Consequently the rest of the onboard switches will have no effect. With switch 1 set in the down position, Dashboard remote control software is prevented from making changes to the card settings. Consequently the onboard switches 2-8 control the settings.

The factory default settings are as follows

1) Remote Control is disabled.
2) Routing is In 1 ->Out A, In 2 ->Out B.
3) Rates A and B are set to Auto.

Note: This card is default set with **remote control set to disabled**. If DashBoard or a Cobalt Remote Panel is to be used with card, enable remote control on card **before** installing card.

Remote Control

In This Chapter

This section provides a detailed explanation on using remote control functions with your card.

DashBoard Control System Software

The DashBoard Control System enables you to monitor and control frames and controller cards from a computer. The DashBoard software and manual can be downloaded from the Cobalt Digital Inc. website.

Using the Menus

You must first install the DashBoard Control System software on your computer. Refer to the ***DashBoard User Manual*** for software installation procedures and for using the DashBoard interface.

The Menu System

The following table and sections describe the menus, items, and parameters available from the DashBoard Control System software for the card.

Table 3. DashBoard Menus

Menu	Item	Parameters	Description
Card Info (Read-only)	Product	CDI-9003	
	Manufacturer	Cobalt Digital Inc.	
	Serial Number	############	Displays the Silicon Serial Number of the card.
	Temperature		Temperature of on card sensor
	Input Current		Current consumed from +12V rail
	Input Voltage		Measured voltage of +12V rail
Control	Remote Control	Enabled/Disabled	This shows whether the remote is enabled (S1-1 on the board is up)
	Routing	In 1→Out A, In 2→Out B In 1→ Out A & B In 2 → Out A & B Fail-Safe	Routes outputs A & B from either their respective inputs, or both from one of the two inputs.
	Rate A	Automatic 2.967/2970 Gbps 1.5835/1.585Gbps 270 Mbps	This forces the reclocker to only run at the specified rate. "Automatic" means the reclocker will detect the input rate and reclock it.
	Lock Status A		Describes the current input rate
	Rate B	Automatic 2.967/2970 Gbps 1.5835/1.585Gbps 270 Mbps	This forces the reclocker to only run at the specified rate. "Automatic" means the reclocker will detect the input rate and reclock it.
	Lock Status B		Describes the current input rate

Service Information

In This Chapter

This chapter includes the following sections:

- Troubleshooting Checklist
- Warranty and Repair Policy

Troubleshooting Checklist

Routine maintenance to this product is not required. In the event of problems with your card, the following basic troubleshooting checklist may help identify the source of the problem. If the module still does not appear to be working properly after checking all possible causes, please contact your products distributor, or the Technical Support department at the numbers listed under the "Contact Us" section at the end of this manual.

1. **Visual Review —** Performing a quick visual check may reveal many problems, such as connectors not properly seated or loose cables. Check the module, the frame, and any associated peripheral equipment for signs of trouble.
2. **Power Check —** Check the power indicator LED on the distribution frame front panel for the presence of power. If the power LED is not illuminated, verify that the power cable is connected to a power source and that power is available at the power main. Confirm that the power supplies are fully seated in their slots. If the power LED is still not illuminated, replace the power supply with one that is verified to work.
3. **Reseat the Card in the Frame** — Eject the card and reinsert it in the frame.
4. **Check Control Settings —** Refer to the Installation and Operation sections of the manual and verify all user-adjustable component settings.
5. **Input Signal Status —** Verify that source equipment is operating correctly and that a valid signal is being supplied.
6. **Output Signal Path —** Verify that destination equipment is operating correctly and receiving a valid signal.
7. **Module Exchange** — Exchanging a suspect module with a module that is known to be working correctly is an efficient method for localizing problems to individual modules.

Warranty and Repair Policy

This product is warranted to be free from defects in material and workmanship for a period of five (5) years from the date of shipment to the original purchaser, except that 4000, 5000, 6000, 8000 series power supplies, and Dolby® modules (where applicable) are warranted to be free from defects in material and workmanship for a period of one (1) year.

Cobalt Digital Inc.'s ("Cobalt") sole obligation under this warranty shall be limited to, at its option, (i) the repair or (ii) replacement of the product, and the determination of whether a defect is covered under this limited warranty shall be made at the sole discretion of Cobalt.

This limited warranty applies only to the original end-purchaser of the product, and is not assignable or transferrable therefrom. This warranty is limited to defects in material and workmanship, and shall not apply to acts of God, accidents, or negligence on behalf of the purchaser, and shall be voided upon the misuse, abuse, alteration, or modification of the product. Only Cobalt authorized factory representatives are authorized to make repairs to the product, and any unauthorized attempt to repair this product shall immediately void the warranty. Please contact Cobalt Technical Support for more information.

To facilitate the resolution of warranty related issues, Cobalt recommends registering the product by completing and returning a product registration form. In the event of a warrantable defect, the purchaser shall notify Cobalt with a description of the problem, and Cobalt shall provide the purchaser with a Return Material Authorization ("RMA"). For return, defective products should be double boxed, and sufficiently protected, in the original packaging, or equivalent, and shipped to the Cobalt Factory Service Center, postage prepaid and insured for the purchase price. The purchaser should include the RMA number, description of the problem encountered, date purchased, name of dealer purchased from, and serial number with the shipment.

Cobalt Digital Inc. Factory Service Center

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www.cobaltdigital.com — Email: info@cobaltdigital.com

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COBALT'S LIABILITY, WHETHER IN CONTRACT, TORT, WARRANTY, OR OTHERWISE, IS LIMITED TO THE REPAIR OR REPLACEMENT, AT ITS OPTION, OF ANY DEFECTIVE PRODUCT, AND SHALL IN NO EVENT INCLUDE SPECIAL, INDIRECT, INCIDENTAL, OR CONSEQUENTIAL DAMAGES (INCLUDING LOST PROFITS), EVEN IF IT HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

In Case of Problems

Should any problem arise with your card, please contact the Cobalt Digital Inc. Technical Support Department. (Contact information is supplied at the end of this publication.)

A Return Material Authorization number (RMA) will be issued to you, as well as specific shipping instructions, should you wish our factory to repair your card. If required, a temporary replacement module will be made available at a nominal charge. Any shipping costs incurred will be the responsibility of you, the customer. All products shipped to you from Cobalt Digital Inc. will be shipped collect.

The Cobalt Digital Inc. Technical Support Department will continue to provide advice on any product manufactured by Cobalt Digital Inc., beyond the warranty period without charge, for the life of the equipment.

Ordering Information

9003 and Related Products

Your **9003 Dual 3G/HD/SD Reclocking Distribution Amplifier** is a part of the openGear® family of products. Cobalt Digital offers a full line of openGear® terminal equipment including distribution, conversion, monitoring, synchronizers, encoders, decoders, embedders, and de-embedders, as well as analog audio and video products.

Standard Equipment

- **9003** Dual 3G/HD/SD Reclocking Distribution Amplifier
- **9003-OM** Dual 3G/HD/SD Reclocking Distribution Amplifier Owner's Manual

Optional Equipment

- **9003-OM** Dual 3G/HD/SD Reclocking Distribution Amplifier Owner's Manual (additional Owner's Manual)
- **RM-9003-A** 20-Slot Frame Rear I/O Module (Standard Width) 2 3G/HD/SD-SDI Inputs, 8 Reclocked 3G/HD/SD-SDI Outputs
- **RM20-9003-B/S-HDBNC** 20-Slot Frame Rear I/O Module (Split High Density) 2 3G/HD/SD-SDI Inputs, 8 Reclocked 3G/HD/SD-SDI Outputs (per card; all connectors HDBNC)
- **RM20-9003-B/S-DIN** 20-Slot Frame Rear I/O Module (Split High Density) 2 3G/HD/SD-SDI Inputs, 8 Reclocked 3G/HD/SD-SDI Outputs (per card; all connectors DIN 1.0/2.3)
- **HPF-9000-CN** High-Power 20-Slot Frame; 2RU with fans, cover plates for unused slots. Includes one PSU-9000 Power Supply Module and MFC-8320-N Network Controller Card.
- **8321-C** 20-Slot Frame and Power Supply with Cooling Fans (2RU, holds 20 cards maximum)
- **MFC-8320-N** Network Controller Card (Additional)

Contact Us

Contact Cobalt Digital Inc.

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